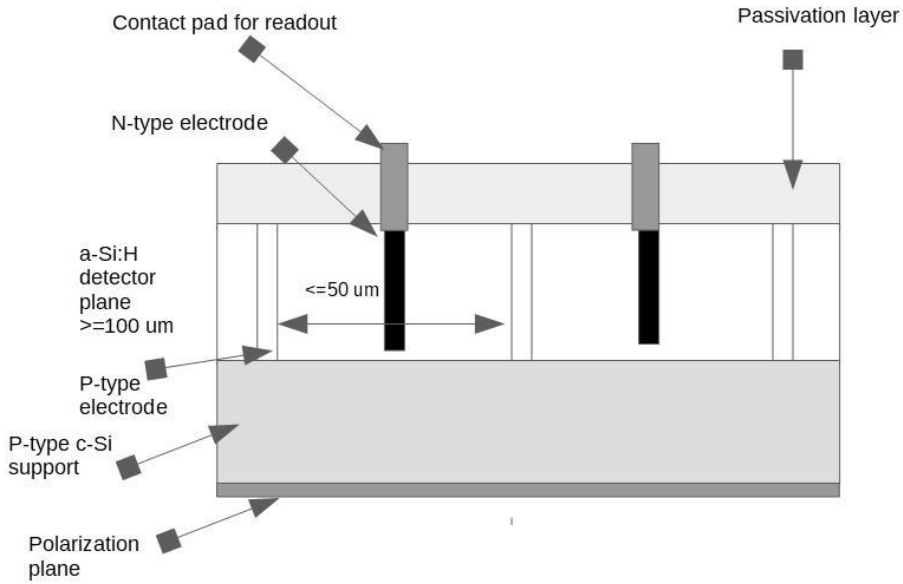
3D HYDROGENATED AMORPHOUS SILICON DETECTOR



PRIORITY NUMBER:

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KEYWORDS:

Particle detector
X-rays
Dosimetry
Low radiation damage
Silicon

The invention relates on a 3D radiation detector, realized using a hydrogenated amorphous silicon substrate. Such a geometry allows the increase of charge collection compared with the planar technologies used up to now for this kind of detector and at the same time the reduction of noise, making it suitable for detecting particles or single X photon. One of the main features of this detector is its high resistance to radiation damage.

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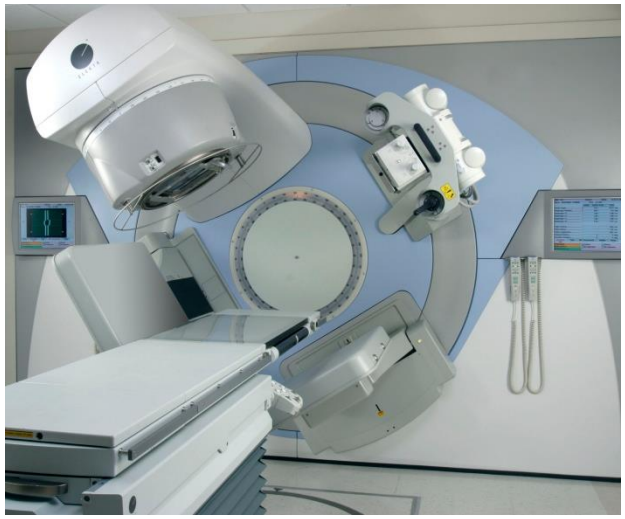

DESCRIPTION :

The adoption, for the hydrogenated amorphous silicon detector, of a 3D geometry, instead of the classical planar configuration, allows the improvement of the device performance in terms of signal detection. To provide a high performance detector it is necessary to increase the signal collection and/or reduce the noise. The 3D geometry and the presence of collection electrodes spaced at suitable distance, in the hydrogenated amorphous silicon substrate allow a more efficient collection of the charge signal developed along the thickness of the substrate itself. These facts make the device usable as both a particle and a single photon detector. Another fundamental advantage of the detector is its high resistance to radiation, which makes it applicable both for research purposes, in the context of future hadronic accelerators, and in the medical and industrial field, for X-ray imaging and particle beam monitors .

ADVANTAGES:

- High radiation resistence;
- Increase of radiation detection efficiency;
- Possibility of deposition of the hydrogenated amorphous silicon substrate on flexible supports.

APPLICATIONS:

- Particle beam monitor, for research, industrial and medical purposes;
- X-ray imaging for medicine;
- X-ray imaging for structural analysis;
- Calorimetry for high energy physics.